

COMMERCIAL STANDARD CS247-62

**TFE-Fluorocarbon (Polytetra-
fluoroethylene) Resin Flexible
Hose (Wire Braid Reinforced)**

A recorded
voluntary standard of the
trade published by
the U.S. Department
of Commerce



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U.S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES
Commodity Standards Division

With the cooperation of the
National Bureau of Standards

EFFECTIVE DATE

Having been passed through the regular procedures of the Commodity Standards Division, and approved by the acceptors hereinafter listed, this Commercial Standard is issued by the U.S. Department of Commerce, effective October 15, 1962.

LUTHER H. HODGES, *Secretary.*

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, Business and Defense Services Administration, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforceable through usual legal channels as a part of the sales contract.

Commercial Standards originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The division by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the division assures continuous servicing of each Commercial Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

"The initial printing of CS247-62 was made possible through the cooperation of the Fluorocarbons Division of The Society of the Plastics Industry, Inc."

TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Flexible Hose (Wire Braid Reinforced)

1. PURPOSE

1.1 The purpose of this Commercial Standard is to establish, on a national basis, standard dimensions and significant quality requirements for wire braid reinforced flexible hose incorporating TFE-fluorocarbon (polytetrafluoroethylene) resin extruded tubing, for the information of producers, distributors, and users, and to promote understanding between buyers and sellers.

2. SCOPE AND CLASSIFICATION

2.1 SCOPE—This Commercial Standard establishes requirements and methods of test for the material, workmanship, dimensions and properties of three grades of wire braid reinforced flexible hose incorporating polytetrafluoroethylene extruded tubing. This hose is primarily for fluid lines operating at temperatures to 450° F. and pressures to 1,500 psi. Methods of marking and indicating compliance with this standard are included.

2.2 CLASSIFICATION—This standard covers three grades of flexible hose as follows:

Grade A—A grade of hose for use in the temperature range of -65° F to 450° F at an operating pressure of from 600 to 1,500 psi depending upon size.

Grade I—A grade of hose for use in the temperature range of -40° F to 450° F at an operating pressure of from 500 to 1,500 psi depending upon size.

Grade C—A grade of hose for use in the temperature range of -40° F to 450° F at an operating pressure of 500 psi.

3. REQUIREMENTS

3.1 CONSTRUCTION—The flexible hose shall consist of an inner tube fabricated from polytetrafluoroethylene or polytetrafluoroethylene based compound reinforced with a covering or wire braid or braids.

3.2 MATERIALS

3.2.1 *Inner tube.*—The inner tube shall be a seamless tube of tetrafluoroethylene resin conforming to the requirements for Type III resin of ASTM Designation D1457-56T,¹ Tetrafluoroethylene Resin Molding and Extrusion Materials, except that a maximum of 2% by weight of additives is permissible. The inner tube shall meet the requirements of this Standard.

¹ Later issues of the ASTM publications specified in this standard may be used providing the requirements are applicable and consistent with the issues designated. Copies of ASTM publications are obtainable from the American Society for Testing and Materials, 1916 Race Street, Philadelphia 3, Pa.

3.2.2 *Wire braid reinforcement.*—The reinforcement shall consist of wire braids or braids of sufficient strength to meet the requirements of this Standard.

3.3 **WORKMANSHIP**—The inner tube of the hose shall be free of cracks, splits, bubbles, and occluded gritty or metallic contamination. Broken or missing wires in the wire braid reinforcement shall be cause for rejection; however, crossed over wires are permissible.

3.4 **DIMENSIONS**—The hose dimensions shall be as specified in tables I, II, and III for the respective grades and sizes.

3.5 PERFORMANCE

3.5.1 *Hose.*—When assembled with suitable fittings the hose assembly incorporating the hose under test shall satisfy the performance requirements specified in tables I, II, and III for the respective grades and sizes, when tested in accordance with the methods described in 3.5.1.1 to 3.5.1.7, inclusive. The manufacturer shall have test records available to the purchaser, to establish that each lot of hose has met these requirements.

3.5.1.1 *Elongation and contraction.*—The hose shall not change in length in excess of the amount specified below when tested in accordance with 4.5.1.1

Grade	Elongation and Contraction (inch)
A	Plus 0.20, minus 0.30
I	Plus 0.25, minus 0.35
C	Plus 0.30, minus 0.40

3.5.1.2 *Volumetric expansion.*—The hose shall not exceed the limits specified when tested in accordance with 4.5.1.2.

3.5.1.3 *Burst pressure.*

3.5.1.3.1 *Room temperature.*—The hose shall not burst and there shall be no leakage or evidence of malfunction below the minimum burst pressure specified, when tested in accordance with 4.5.1.3.

3.5.1.3.2 *High temperature.*—The hose shall not burst and there shall be no leakage or evidence of malfunction below the minimum burst pressure specified while at 450° F., when tested in accordance with 4.5.1.4.

3.5.1.4 *Oil resistance.*—The hose shall not burst and there shall be no leakage or evidence of malfunction while the hose is withstanding pressurization at the temperatures specified below plus a temperature shock, when tested in accordance with 4.5.1.5.

Grade	Temperature
A	−65°F to 450°F
I	−40°F to 450°F
C	−40°F to 450°F

3.5.1.5 *High and low temperature cycling.*—The hose shall not burst and there shall be no leakage or evidence of malfunction while

TABLE 1 - GRADE A FLEXIBLE HOSE REQUIREMENTS

HOSE SIZE No.	HOSE DIMENSIONS ^{1/}		OPERATING PRESSURE (MAX.)	PROOF ^{1/} PRESSURE	BURSTING PRESSURE (MIN.)		BENDING ^{2/} RADIUS (MIN.)	VOLUMETRIC EXPANSION PER INCH (MAX.)	INNER TUBE ^{1/} PROOF PRESSURE (MIN.)
	INSIDE DIAMETER	INNER TUBE WALL THICKNESS			ROOM TEMP.	HIGH TEMP.			
3	0.125	0.040	1,500	3,000	12,000	7,500	2	0.028	300
4	0.188	0.040	1,500	3,000	12,000	7,000	2	0.028	275
5	0.250	0.040	1,500	3,000	10,000	6,500	2	0.040	250
6	0.313	0.040	1,500	3,000	9,000	6,500	4	0.048	195
8	0.406	0.043	1,500	3,000	8,000	6,000	4-5/8	0.074	160
10	0.500	0.047	1,300	3,000	7,000	5,500	5-1/2	0.136	145
12	0.625	0.047	1,000	2,000	6,000	4,000	6-1/2	0.217	110
16	0.875	0.047	800	1,600	3,200	3,000	9	0.531	70
20	1.125	0.050	600	1,200	2,400	2,000	16	0.632	50
16 ^{2/3}	0.875	0.047	800	1,600	3,200	3,000	7-3/8	0.531	70
20 ^{2/3}	1.125	0.050	600	1,200	2,400	2,000	11	0.632	50

^{1/} TOLERANCES

DIMENSIONS

INSIDE DIAMETER - SIZES 3 THROUGH 10 - PLUS OR MINUS 0.015 INCH
 SIZE 12 - PLUS OR MINUS 0.020 INCH
 SIZES 16 THROUGH 20^{2/3} - PLUS OR MINUS 0.031 INCH

WALL THICKNESS - PLUS 0.007, MINUS 0.005 INCH

PRESSURES

HOSE PROOF PRESSURE - PLUS OR MINUS 100 PSI

INNER TUBE PROOF PRESSURE - PLUS 10%, MINUS 0%

^{2/} BENDING RADIUS MEASURED TO INSIDE OF THE BEND.

^{3/} 2 INDICATES DOUBLE BRAID HOSE.

TABLE 11 - GRADE 1 FLEXIBLE HOSE REQUIREMENTS

HOSE SIZE NO.	HOSE DIMENSIONS ^{1/}		OPERATING PRESSURE (MAX.)	PROOF ^{1/} PRESSURE	BURSTING PRESSURE (MIN.)		BENDING ^{2/} RADIUS (MIN.)	VOLUMETRIC EXPANSION PER INCH (MAX.)	INNER TUBE ^{1/} PROOF PRESSURE (MIN.)
	INSIDE DIAMETER	INNER TUBE WALL THICKNESS			ROOM TEMP.	HIGH TEMP.			
3	0.125	0.040	1500	3000	10,200	6000	2-1/2	0.035	250
4	0.188	0.040	1500	3000	10,200	6000	2-1/2	0.035	230
5	0.250	0.040	1500	3000	8,500	5500	2-1/2	0.047	210
6	0.313	0.040	1500	3000	7,700	5500	4-1/2	0.056	165
8	0.406	0.043	1500	3000	7,000	5000	5	0.087	135
10	0.500	0.047	1500	3000	6,000	4500	6-1/2	0.160	125
12	0.625	0.047	1000	2000	5,000	3400	7-3/4	0.252	95
16	0.875	0.047	700	1400	2,800	2500	10-1/2	0.625	60
20	1.125	0.050	500	1000	2,000	1800	19	0.745	45
16 ^{3/}	0.875	0.047	700	1400	2,800	2500	8-1/2	0.625	60
20Z	1.125	0.050	500	1000	2,000	1800	13	0.745	45

^{1/} TOLERANCES

DIMENSIONS
INSIDE DIAMETER - SIZES 3 THROUGH 10 - PLUS OR MINUS 0.023 INCH
SIZE 12 THROUGH 20Z - PLUS OR MINUS 0.031 INCH
WALL THICKNESS - PLUS 0.010 INCH, MINUS 0.008 INCH

PRESSURES
HOSE PROOF PRESSURE - PLUS OR MINUS 100 PSI
INNER TUBE PROOF PRESSURE - PLUS 10%, MINUS 0%

^{2/} BENDING RADIUS MEASURED TO INSIDE OF BEND.

^{3/} Z INDICATES DOUBLE BRAID HOSE.

TABLE III - GRADE C FLEXIBLE HOSE REQUIREMENTS

HOSE SIZE No.	HOSE DIMENSIONS ^{1/}		OPERATING PRESSURE (MAX.)	PROOF ^{1/} PRESSURE	BURSTING PRESSURE (MIN.)		BENDING ^{2/} RADIUS (MIN.)	VOLUMETRIC EXPANSION PER INCH (MAX.)	INNER TUBE ^{1/} PROOF PRESSURE (MIN.)
	INSIDE DIAMETER	INNER TUBE WALL THICKNESS			ROOM TEMP.	HIGH TEMP.			
3	INCH 0.125	INCH 0.040	PSI 500	PSI 1000	PSI 3000	PSI 1500	INCHES 2-3/4	CC (ML) 0.040	PSI 210
4	0.188	0.040	500	1000	3000	1500	2-3/4	0.040	190
5	0.250	0.040	500	1000	3000	1500	2-3/4	0.057	175
6	0.313	0.040	500	1000	3000	1500	5-1/2	0.068	135
8	0.406	0.043	500	1000	3000	1500	6-1/2	0.105	110
10	0.500	0.047	500	1000	3000	1500	8	0.194	100
12	0.625	0.047	500	1000	3000	1500	9	0.310	75
16	0.875	0.047	500	1000	2000	1000	12	0.760	50
20	1.125	0.050	500	1000	2000	1000	23	0.900	35
16 ^{2/3/}	0.875	0.047	500	1000	2000	1000	10-1/2	0.760	50
20 ^{2/}	1.125	0.050	500	1000	2000	1000	16	0.900	35

^{1/} TOLERANCES

DIMENSIONS

INSIDE DIAMETER - SIZES 3 THROUGH 10 - PLUS OR MINUS 0.031 INCH
SIZES 12 THROUGH 20^{2/} - PLUS OR MINUS 0.040 INCH
WALL THICKNESS - PLUS OR MINUS 0.016 INCH

PRESSURES
HOSE PROOF PRESSURE - PLUS OR MINUS 100 PSI
INNER TUBE PROOF PRESSURE - PLUS 10%, MINUS 0%

^{2/} BENDING RADIUS MEASURED TO INSIDE OF BEND.

^{3/} Z INDICATES DOUBLE BRAID HOSE.

the hose is subjected to the number of cycles of temperature specified below, when tested in accordance with 4.5.1.6.

Grade	Number of cycles	Temperature
A	10	-67 °F to 450 °F
I	5	-40 °F to 450 °F
C	1	-40 °F to 450 °F

3.5.1.6 *Flexibility and vacuum.*—Reduction of the inside diameter of the hose to a value less than that of the ball specified (see 4.5.1.7) or permanent damage to the assembly as a result of flexing, shall constitute failure when tested at the temperatures specified below in accordance with 4.5.1.7.

Grade	Temperatures
A	-67 °F and 450 °F
I	-40 °F and 450 °F
C	-40 °F (No vacuum test at 450 °F required)

3.5.1.7 *Impulse (Grade A only).*—The hose shall not burst and there shall be no leakage while the hose is withstanding 100,000 impulse cycles at 400 °F after high temperature aging as specified in 4.5.1.8.

3.5.2 *Inner tube.*—The inner tube shall conform to the performance requirements specified in 3.5.2.1 to 3.5.2.3, inclusive. The manufacturer shall have test records available to the purchaser to establish that each lot of inner tubes has met these requirements.

3.5.2.1 *Specific gravity.*—The inner tube shall have a specific gravity between 2.13 and 2.16 when tested in accordance with 4.5.2.1.

3.5.2.2 *Burst pressure.*—The inner tube shall not burst below a value equal to twice the inner tube proof pressure specified in tables I, II, and III for the respective grades and sizes, when tested in accordance with 4.5.2.2.

3.5.2.3 *Tensile and elongation.*—The inner tube shall meet the following requirements when tested in accordance with 4.5.2.3.

Tensile Strength	Longitudinal	3000 psi minimum
	Transverse	1800 psi minimum
Elongation		200% minimum

4. TEST METHODS

4.1 SPECIMENS—Hose assembly specimens for performance testing shall be as follows:

Hose Assembly Number	Tests
1 and 2	4.5.1.1, 4.5.1.2 and 4.5.1.3 in order
3 and 4	4.5.1.4
5 and 6	4.5.1.5
7 and 8	4.5.1.6
9 and 10	4.5.1.7
11, 12, 13 and 14	4.5.1.8 (Grade A only)

Length of the specimen lines shall be 18 inches except lines for impulse test which shall be as specified. (See 4.5.1.8.)

4.2 TEST FLUIDS—Unless otherwise specified herein the test fluid shall be hydraulic oil conforming to Military Specification MIL-H-5606,² Oil; Hydraulic, Aircraft, Petroleum Base. When a high temperature test fluid is specified the test fluid shall be hydraulic fluid or oil conforming to MIL-H-8446,² Hydraulic Fluid, Non-Petroleum Base, Aircraft, or MIL-L-7808,³ Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, respectively.

4.3 TOLERANCES FOR TEST CONDITIONS

4.3.1 *Temperatures.*—Temperature measurements shall be taken within six inches of the assemblies under test. All low temperatures (-40°F. or -65°F.) shall have a tolerance of $\pm 2^{\circ}\text{F.}$ All high temperatures (400°F. or 450°F.) shall have a tolerance of $+15/-5^{\circ}\text{F.}$

4.3.2 *Test periods.*—The following tolerances shall apply to all test periods referred to in the tests. All test periods expressed in minutes shall have a tolerance of $+1/-0$ minutes and all test periods between 1 and 10 hours shall have a tolerance of $+1/-0$ hours. Test periods in excess of 10 hours shall have a tolerance of $+10\%$ up to a maximum of 10 hours/ -0 hours.

4.4 INSPECTION

4.4.1 *Inspection.*—The tubing specimens shall be inspected for type of material and workmanship to determine compliance with this standard. The dimensions of three specimens shall be determined in accordance with Method A or C of ASTM Designation D374-57T (See Note 1), Methods of Test for Thickness of Solid Electrical Insulations, modified to use as the fixed anvil of the micrometer a pin smaller than the minimum tubing inside diameter for the measurement of the thickness of the wall. "Go" and "No Go" pins shall be used for measurement of the inside diameter of the tubing.

4.5 TESTS.

4.5.1 *Hose.*

4.5.1.1 *Elongation and contraction test.*—The test assemblies shall be held in a straight unpressurized condition and a 10-inch standard length marked off on the hose. It shall then be pressurized to the operating pressure for 5 minutes. At the end of this 5-minute period and while still pressurized the standard length shall be measured and recorded.

4.5.1.2 *Volumetric expansion test.*—This test shall be conducted in accordance with ASTM Designation D571-55 (see Note 1), Methods of Testing Automotive Hydraulic Brake Hose. The volumetric expansion of the test assemblies shall be recorded at a pressure of 1,000 psi, plus 100, minus 0 psi.

4.5.1.3 *Room temperature burst pressure test.*—During this test the assemblies shall be fastened at one end to the source of pressure. They shall be extended straight and the free end shall not be restrained or fastened in any way. The rate of pressure rise of the test fluid (see 4.2) shall be 25,000 plus 0/minus 10,000 psi per minute until failure is obtained. The hose assemblies shall be under continuous observation during pressure increase and the type of failure shall be recorded.

² Copies of these Military Specifications may be obtained from the Commander, Wright Air Development Center (Attn: WCXP), Wright-Patterson Air Force Base, Ohio.

³ Copies of this Military Specification may be obtained from the Commanding Officer, Rock Island Arsenal, Rock Island, Ill.

4.5.1.4 *High temperature burst pressure test.*—The test assemblies shall be filled with test fluid (see 4.2) and held in an oven one hour at a temperature of $450^{\circ}\text{F.} \pm 10^{\circ}\text{F.}$ After 1 hour, the pressure shall be raised to the rated operating pressure for a period of 5 minutes. At the end of this 5-minute period the pressure shall be increased at a rate of 25,000 plus 0/minus 10,000 psi per minute until failure is obtained. The hose assemblies shall be under continuous observation during the test and the type of failure shall be recorded.

4.5.1.5 *Oil resistance test.*

a. The test assemblies shall be filled with a high temperature oil (see 4.2), at room temperature, and placed in an oven at 450°F. After the unit has stabilized at this temperature the internal pressure shall be raised to the rated operating pressure and the unit held at temperature for 60 hours.

b. The test assemblies shall then be placed in a cold chamber at the rated low temperature for a period of 4 hours. At the end of this time, while still at this temperature, the assemblies shall be subjected to the rated operating pressure for 5 minutes, and the pressure then released. The pressure cycling shall be continued for 10 complete cycles, with 5 minutes between each pressure application.

c. The assemblies shall then be warmed to room temperature and subjected to the rated proof pressure for 5 minutes.

d. The assemblies shall then be mounted, empty, in a test set-up (typical set-up shown in Figure 1) and the ambient temperature reduced to the rated low temperature for 24 hours. At the end of this time, oil at a temperature of 450°F. shall be suddenly introduced at a pressure of 50 psi. Immediately after the hot oil has filled the assembly, the pressure shall be raised to the rated proof pressure for 5 minutes. Not more than 15 seconds shall elapse between the introduction of the high temperature oil at 50 psi and the raising of the pressure to proof pressure.

4.5.1.6 *High and low temperature cycling test.*—Test assemblies shall be aged, empty, in an air oven for 50 hours at a temperature of 450°F. The test assemblies shall then be removed from the oven, cooled to room temperature and subjected to the rated proof pressure for 5 minutes. After the pressure test, the assemblies shall be placed, empty, in a cold chamber for 24 hours at the rated low temperature. The assemblies shall then be removed from the cold chamber, held at room temperature for 30 minutes, and subjected to the rated proof pressure for 5 minutes.

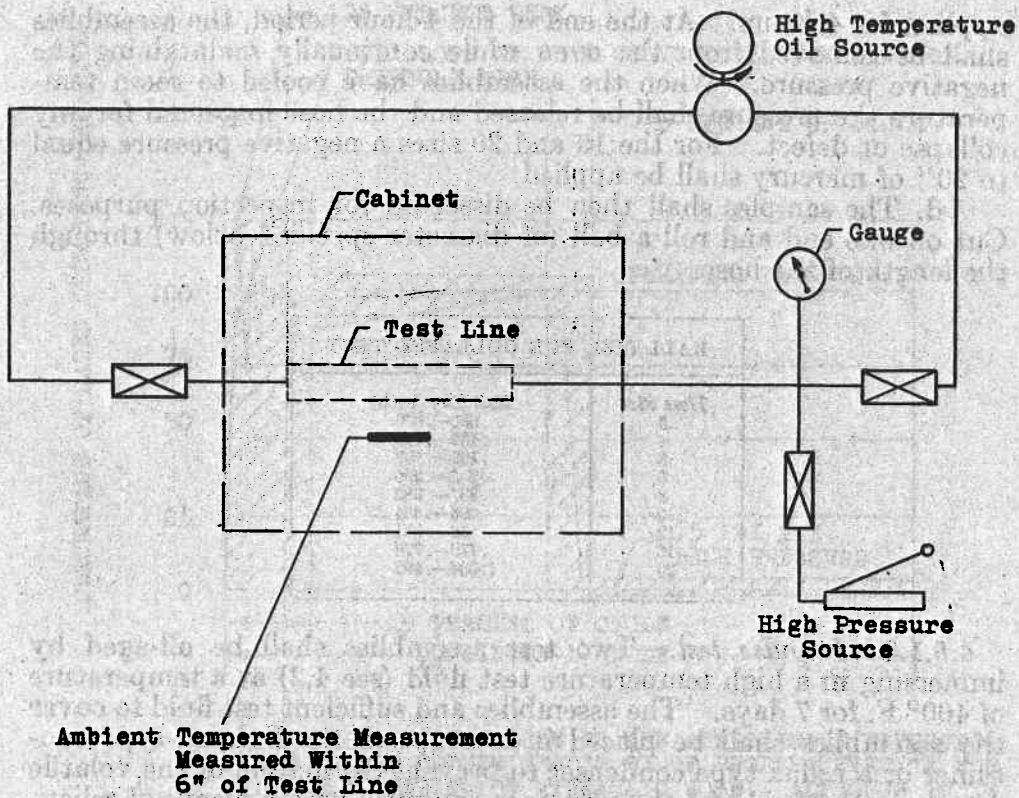
4.5.1.7 *Flexibility and vacuum test.*

a. The test assemblies shall be filled with test fluid conforming to the requirements for Type I of Military Specification MIL-S-3136A⁴, Standard Test Fluids, Hydrocarbon and Iso-octane, and placed in a cold chamber at the rated low temperature for 24 hours.

b. At the end of this time, while still at this temperature, the assemblies shall be bent to a 180 degree "U" bend around a mandrel with a radius equal to the minimum bend radius as specified. The assembly shall then be bent equally in the opposite direction and then returned to the straight position. This cycle shall be repeated a total of 5 times allowing about 4 seconds per cycle.

c. The test assemblies shall then be placed in an oven at a temperature of 450°F. with a negative pressure equal to 28" of mercury

⁴ Copies may be obtained from the Chief of Ordnance, Department of the Army, Washington 25, D.C.



TYPICAL SETUP FOR TEMPERATURE PRESSURE TESTING

FIGURE I

REMARKS ON RESULTS FOR TEMPERATURE TEST			
TEST NO.	TEMP. (°F)	TIME (min)	REMARKS
1	100	10	OK
2	100	10	OK
3	100	10	OK
4	100	10	OK
5	100	10	OK
6	100	10	OK
7	100	10	OK
8	100	10	OK
9	100	10	OK
10	100	10	OK

applied for 4 hours. At the end of the 4-hour period, the assemblies shall be removed from the oven while continually maintaining the negative pressure. When the assemblies have cooled to room temperature the pressure shall be released and the hose inspected for any collapse or defect. For the 16 and 20 sizes a negative pressure equal to 20" of mercury shall be applied.

d. The samples shall then be dissected for inspection purposes. Cut off one end and roll a ball (of diameter specified below) through the length of the hose.

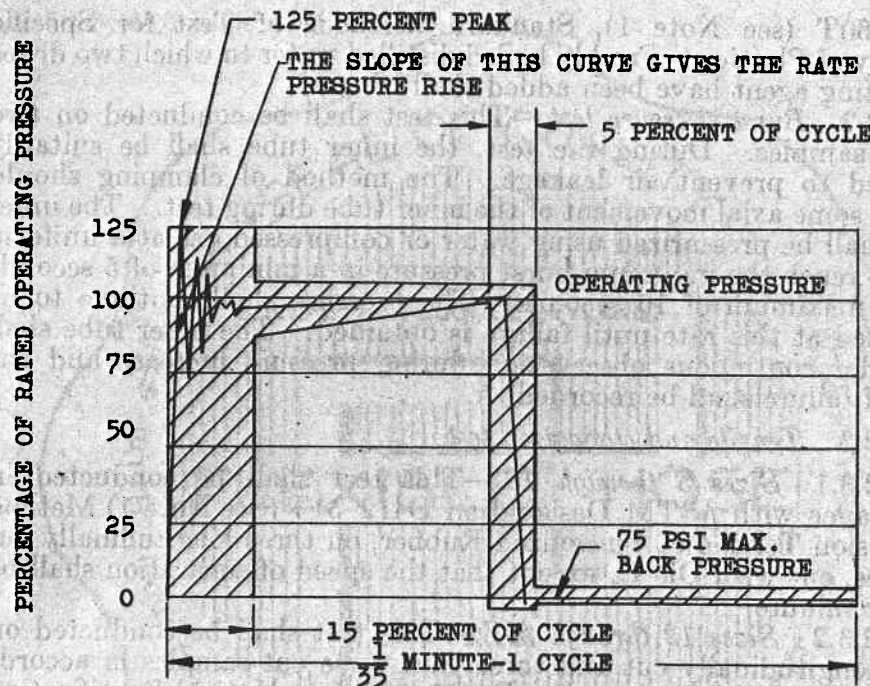
BALL SIZE FOR COLLAPSE TEST	
Hose Size	Ball Size (inch)
3	.080—.076
4	.132—.125
5	.193—.187
6	.255—.250
8	.337—.332
10	.426—.421
12	.538—.531
16	.778—.770
20	1.004—.996

4.5.1.8 *Impulse test.*—Two test assemblies shall be oil-aged by immersing in a high temperature test fluid (see 4.2) at a temperature of 400° F. for 7 days. The assemblies and sufficient test fluid to cover the assemblies shall be placed in a nonpressurized closed-type container or a reflux type condenser to prevent distillation of the volatile matter in the fluid and the container equipped with a means of relieving excess pressure. A new batch of fluid shall be used for each 10 tests or less. All air shall be excluded from the bore of the tube during this aging. Two test assemblies shall be air-aged at 400° F. for 7 days. All aged assemblies shall be subjected to the rated proof pressure for 5 minutes after aging. The test assemblies shall be connected to rigid supports and bent in a U-shape with a bend radius at the apex of the bend as specified in Table I. The 16, 16Z, 20, and 20Z sizes shall be tested in a straight position; one end may be free. Electronic measuring devices shall be used to determine and control the impulse in the inlet manifold as shown by the graph in figure 2. The 20 and 20Z sizes shall not be subjected to any peak above the specified operating pressure. The impulse shall occur at 35 ± 5 cycles per minute. The test fluid shall be one of the high temperature test fluids (see 4.2) at 400° F. $\pm 5^\circ$ F. measured at the test manifold with the ambient air at 400° F.

LENGTH OF ASSEMBLIES FOR IMPULSE TEST			
Hose Size	Length (inches)	Hose Size	Length (inches)
3	14	12	27½
4	14	16	18
5	16	20	18
6	18	16Z	18
8	21	20Z	18
10	23½		

4.5.2 *Inner tube.*

4.5.2.1 *Specific gravity test.*—This test shall be conducted on three 1-inch samples in accordance with Method A of ASTM Designation



THE CURVE SHOWN ABOVE IS THE APPROXIMATE PRESSURE-TIME CYCLE DETERMINED TO BE OF PROPER SEVERITY FOR IMPULSE TESTING OF HYDRAULIC HOSE. ALTHOUGH IT IS MANDATORY ONLY THAT PRESSURE PEAK RISES TO 125 PERCENT OF THE OPERATING PRESSURE AT SOME POINT PRIOR TO LEVELING OFF AT RATED PRESSURE, IT IS CONSIDERED HIGHLY DESIRABLE THAT THE PRESSURE-TIME CURVE BE CONFINED TO THE SHADED AREA INDICATED. ONE VERY DESIRABLE BENEFIT TO BE GAINED IN THIS MANNER IS THAT RESULTS OF TESTS PERFORMED ON DIFFERENT TEST MACHINES WILL BE MORE NEARLY COMPARABLE.

FIGURE 2. DYNAMIC PRESSURE IMPULSES

D792-60T (see Note 1), Standard Methods of Test for Specific Gravity of Plastics. Freshly boiled distilled water to which two drops of wetting agent have been added shall be used.

4.5.2.2 *Burst pressure test.*—This test shall be conducted on two 2-foot samples. During the test, the inner tube shall be suitably clamped to prevent air leakage. The method of clamping should permit some axial movement of the inner tube during test. The inner tube shall be pressurized using water or compressed gas at a uniform rate to reach the minimum burst pressure in a minimum of 5 seconds and a maximum of 10 seconds. The pressure shall continue to be increased at this rate until failure is obtained. The inner tube shall be under continuous observation during pressure increase and the type of failure shall be recorded.

4.5.2.3 *Tensile and elongation test.*

4.5.2.3.1 *Sizes 3 through 10.*—This test shall be conducted in accordance with ASTM Designation D412-51T (See Note 1) Method of Tension Testing of Vulcanized Rubber, on three longitudinally cut samples, cut with Die C, except that the speed of separation shall be 2" per minute.

4.5.2.3.2 *Sizes 12 through 20Z.*—This test shall be conducted on three longitudinally cut and three transverse cut samples in accordance with ASTM Designation D1457-56T (see Note 1) Specification for Tetrafluoroethylene Resin Molding and Extrusion Materials.

5. IDENTIFICATION

5.1 **LABELS AND LITERATURE.**—In order that purchasers may be assured that the polytetrafluoroethylene hose actually complies with all requirements of the Commercial Standard, it is recommended that manufacturers include the following statement in conjunction with their name and address on labels, invoices, sales literature, etc.:

This flexible hose complies with Commercial Standard CS247-62, Grade as developed by the trade under the procedure of the Commodity Standards Division, and issued by the U.S. Department of Commerce.

5.1.1 The following abbreviated statement is suggested when available space on labels is insufficient for the full statement:

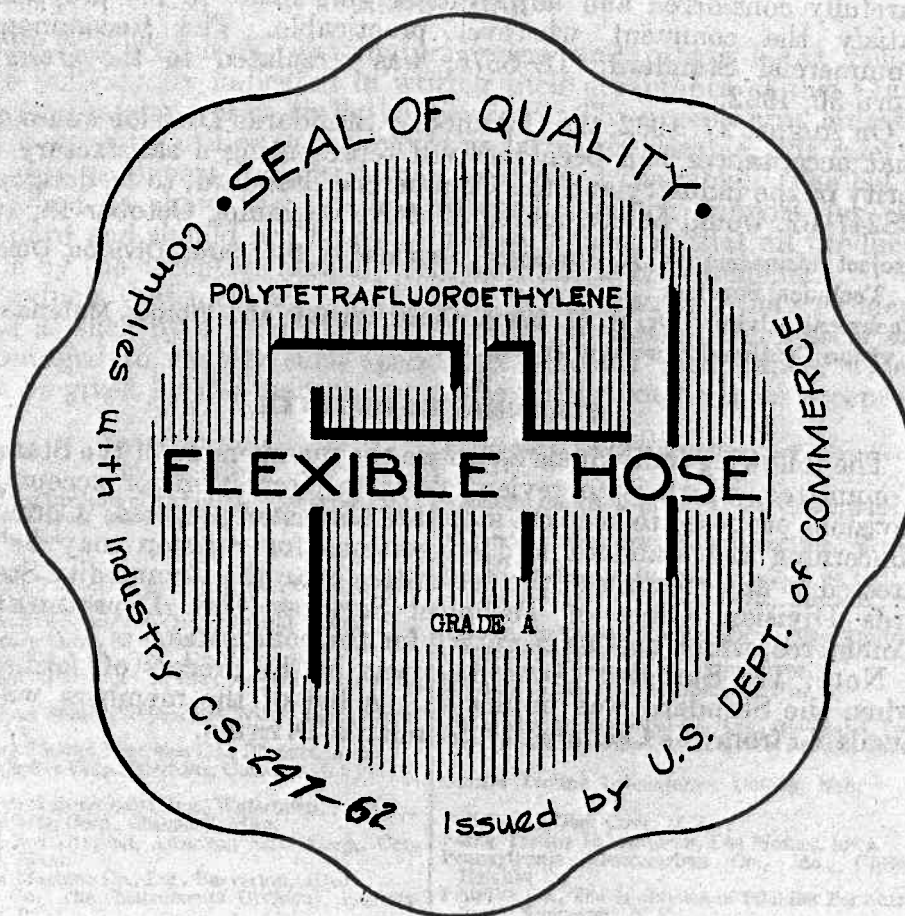
Complies with CS247-62, Grade as developed by the trade and issued by the U.S. Department of Commerce.

5.2 **HALLMARK.**—Polytetrafluoroethylene hose may carry the Hallmark shown to indicate compliance with this Commercial Standard.

HISTORY OF PROJECT

In a letter dated June 23, 1960, the Society of the Plastics Industry, Inc., requested the cooperation of the Commodity Standards Division in the establishment of a Commercial Standard for TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Flexible Hose (Wire Braid Reinforced), and submitted as a basis a tentative standard developed by the Fluorocarbon Division of that organization.

The Commodity Standards Division circulated copies of the proposed Commercial Standard to representative producers, distributors, users, laboratories, and Government agencies for constructive comment. All comments and suggestions received were



Grade of Hose

A
I
C

Color of Tag

White with black lettering
Orange with black lettering
Pale blue with black lettering

HALLMARK

carefully considered and adjustments were made to the proposal to satisfy the comment wherever practicable. The Recommended Commercial Standard, TS-5576, was circulated to the trade on April 30, 1962.

On August 27, 1962, the Commodity Standards Division announced that acceptances had been received representing a satisfactory majority of the industry and the Commercial Standard, to be designated CS247-62, would be considered effective beginning October 15, 1962.

Project Manager: D. R. Stevenson, Commodity Standards Division, Office of Technical Services.

Technical Adviser: Dr. G. M. Kline, Chief, Organic and Fibrous Materials Division, National Bureau of Standards.

STANDING COMMITTEE

The following individuals comprise the membership of the Standing Committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, which acts as secretary for the committee.

Note: The Standing Committee was in the process of formation when the Standard was published. A list of the members will be available from the Commodity Standards Division.

ACCEPTORS

The manufacturers, distributors, users and others listed below have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the standard as far as practicable, but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the standard and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the standard may be identified as such by a certificate, grade mark, or label. Purchasers are encouraged to require such specific evidence of compliance, which may be given by the manufacturer whether or not he is an acceptor.

ASSOCIATIONS (General Support)

American Institute of Architects, Washington, D.C.
The Society of the Plastics Industry, Inc., New York, N.Y.

FIRMS

Accurate Felt and Gasket Mfg. Co., Chicago, Ill.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Aeromotive Specialties Corp., Detroit, Mich.
Aerospace Corp., El Segundo, Calif.
Aldrich Pump Co., The, Allentown, Pa.
American Duraflm Co., Inc., Newton Lower Falls, Mass.
American Super-Temperature Wires, Inc., Winoski, Vt.
Arizona Plastics Extrusion Co., Phoenix, Ariz.
Aero Gasket Corp., Meriden, Conn.
Black & Webster Sales, Inc., Watertown, Mass.
Bonny Mfg. Corp., Maynard, Mass.
Brand-Rex Division, American Enka Corp., Concord, Mass.
Brown Machine Co., Inc., Beaverton, Mich.
Budd Co., The (Instruments Division), Phoenixville, Pa.
Cadillac Plastic & Chemical Co., Cincinnati, Ohio.
Canton Stoker Corp., Canton, Ohio.
Cary Chemicals, Inc., E. Brunswick, N.J.
Century Electric Co., St. Louis, Mo.
Chase Sales Co., Hayward, Calif.
Chicago-Alis Mfg. Corp., Chicago, Ill.
Clark Equipment Co. (Construction Machinery Div.), Benton Harbor, Mich.
Cobon Plastics Corp., Newark, N.J.
Cooper Tire & Rubber Co., Findlay, Ohio.
Continental-Diamond Fibre Corp., Newark, Del.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dahl, Geo. W., Co., Inc., Bristol, R.I.
Detroit Testing Laboratory, Inc., The, Detroit, Mich.
Dielectrix Corp., Farmingdale, N.Y.
Dodge Fibers Corp., Hoosick Falls, N.Y.
Eaton Mfg. Co. (Dynamatic Div.), Kenosha, Wis.
Eco Engineering Co., Newark, N.J.
Edgerton, Germeshausen & Grier, Inc., Boston, Mass.
Electric Hose & Rubber Co., Wilmington, Del.
Ethylene Corp., Murray Hill, N.J.
Farrel Birmingham Co., Watson Stillman Div., Rochester, N.Y.
Fluorulon Lab's Inc., Caldwell, N.J.
Fluoro-plastics, Inc., Philadelphia, Pa.
Fuller Co., Catasauqua, Pa.
General Plastics Corp., Bloomfield, N.J.
General Precision, Inc. (Librascope Div.), Glendale, Calif.
Greene, Tweed & Co., North Wales, Pa.
Halogen Insulator & Seal Corp., Franklin Park, Ill.
Hoke, Inc., Cresskill, N.J.

International Business Machines Corp., New York, N.Y.

Koehring Co. (H-P-M Div.), Mt. Gilead, Ohio.
Laboratory Plasticware Fabricators, Inc., Kansas City, Mo.
Lembo Machine Works, Inc., Paterson, N.J.
Liquid Nitrogen Processing Corp., Malvern, Pa.
Modern Industrial Plastics Div. (The Duriron Corp.), Dayton, Ohio.
Molecular Dielectrics, Inc., Clifton, N.J.
Murphy Diesel Co., Milwaukee, Wis.

National Automatic Tool Co., Inc., Richmond, Ind.
New Britain Machine Co., The, New Britain, Conn.

Omaha Testing Laboratories, Omaha, Neb.

Pall Corp., Glen Cove, N.Y.
Patzig Testing Laboratories, Des Moines, Iowa.
Pennsylvania Fluorocarbon Co., Inc., Clifton Heights, Pa.
Pfaudler Co., The (a division of Pfaudler Permutit, Inc.), Rochester, N.Y.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
Port Plastics, Inc., Los Angeles, Calif.
Precision Chemical Pump Corp., Waltham, Mass.

Raybestos-Manhattan, Inc. (Plastic Products Div.), Manheim, Pa.
Resistoflex Corp., Roseland, N.J.

Shamban, W. S., & Co., Los Angeles, Calif.
South Bend Lathe, Inc., South Bend, Ind.
Southern Testing Laboratories, Inc., Birmingham, Ala.
Sparta Mfg. Co. (Div. U.S. Ceramic Tile Co.), Dover, Ohio.
S & S Mfg. Co., Rahway, N.J.

Thermax Wire Corp., New York, N.Y.
Toefco Engineering, Inc., Niles, Mich.
Titeflex, Inc., Springfield, Mass.
Twin City Testing & Eng. Lab., Inc., St. Paul, Minn.

U.S. Gasket (Div. of Garlock, Inc.), Camden, N.J.

Williams, White & Co., Moline, Ill.
Witco Chemical Co., Inc., New York, N.Y.

U.S. GOVERNMENT

Veterans Administration, Technical Representative on Standards, Washington, D.C.

Department of Health, Education and Welfare, Washington, D.C.
Department of the Interior, Division of Property Management, Washington, D.C.
Department of the Army, Standardization Branch, Technical Services Division, Research and Development, Washington, D.C.

ACCEPTANCE OF COMMERCIAL STANDARD

CS 247-62 The-Fluorocarbon (Polytetrafluoroethylene) Resin Flexible Hose (Wire Braid Reinforced)

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date _____

Commodity Standards Division
Office of Technical Services
U. S. Department of Commerce
Washington 25, D. C.

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹
of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer _____
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City, zone, and State _____

¹ Underscore the applicable words. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interest, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

(Cut on this line)

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard, where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function, performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a nationwide basis is fourfold: First, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

federal register



DEPARTMENT OF COMMERCE

National Bureau of Standards

COMMERCIAL STANDARD

Action on Proposed Withdrawal

In accordance with § 10.12 of the Department's "Procedures for the Development of Voluntary Product Standards" (15 CFR part 10), notice is hereby given of the withdrawal of Commercial Standard CS 247-62, "TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Flexible Hose (Wire Braid Reinforced)." It has been determined that this standard is technically inadequate, no longer used by the industry, and no longer in the public interest to maintain.

This action is taken in furtherance of the Department's announced intentions as set forth in the public notice appearing in the FEDERAL REGISTER of May 18, 1978 (43 FR 21496), to withdraw this standard.

The effective date for the withdrawal of this standard will be on October 3, 1978. This withdrawal action terminates the authority to refer to this standard as a voluntary standard developed under the Department of Commerce procedures.

Dated: July 31, 1978.

ERNEST AMBLER,
Director.

[FR Doc. 78-21683 Filed 8-3-78; 8:45 am]

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